Southern New Hampshire PFOA Investigation: Public Meeting in Bedford, NH

June 2, 2016

Agenda

- **Introduction**
- **PFCs Background**
- **Health Effects**
  - Clark Freise, Assistant Commissioner DES
- **Public Water Supply Sampling and Water Treatment**
  - Brandon Kernen, Manager, Hydrology/Conservation
- **Status of Investigations**

  John Regan, Administrator, Hazardous Waste Remediation
- **Next Steps and Information/Communication**
  - Clark Freise, Assistant Commissioner
- **Questions and Answers (written)**

  Hand to Rick Sawyer or DES staff during presentation please!
  - Rick Sawyer, Bedford Town Administrator
- **Informal Q&A (verbal – 2 minute limit)**
  - Rick Sawyer, Bedford Town Administrator

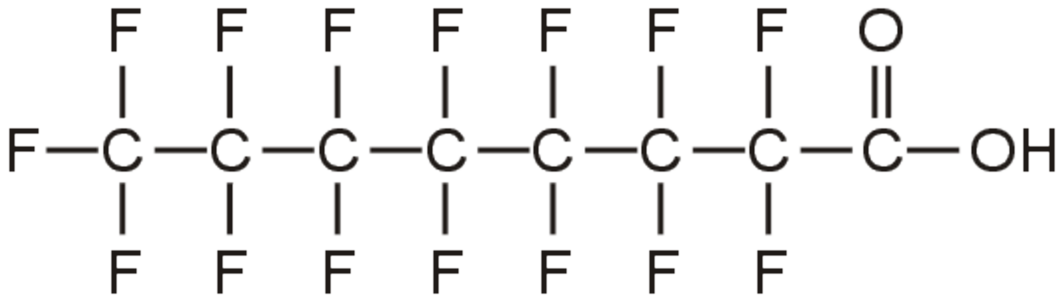
PFCs Background

What are Perfluorochemicals (PFCs)?

- Family of synthetic chemicals comprised primarily of long chains of carbon and fluorine
- Used for decades to make products that resist heat, oils, grease, stains and water
  - Non-stick cookware
  - Outdoor clothing
  - Stain-resistant carpet
  - Fire-fighting foam
  - Paper/packaging
  - Cleaning products
  - Pesticides

What is Perfluorooctanoic Acid (PFOA)?

- PFOA is a specific perfluorochemical (PFC)



- Used in the production of other PFCs, including Teflon^{R}
- Often produced as its ammonium salt, ammonium perfluorooctanoate (APFO)
- Produced and used since the 1940s

Fate and Transport of PFOA

- Use of PFOA in manufacturing can result in releases to air, water, and soil
- PFOA released to the air is readily adsorbed to particles and settles to the ground
- PFOA deposited into/onto the soil can be transported to and contaminate groundwater
- PFOA is very resistant to degradation and so is very persistent in the environment

Fate and Transport of PFOA (cont.)

- PFOA is found in water, soil, and sediments, and in the blood and tissue of wildlife throughout the world
- Nearly all people have some level of PFOA in their blood
- Potential health effects from exposure to low levels of PFOA are not well understood
- The Environmental Protection Agency (EPA) has identified PFOA as an “emerging contaminant”

PFOS - Perfluorooctane Sulfonate

- PFOS has also been found in wells in Bedford and at the Merrimack Landfill
- PFOS was the key ingredient in Scotchgard
  - A fabric protector made by 3M (personal and industrial)
- PFOS was also used to make aqueous film forming foam (AFFF)
  - Widely used by military (Pease)
  - Also used by NH fire departments
- Also used in plating (metal and semiconductor)
- Similar concerns and issues as with PFOA
  - Very persistent in the environment
  - Combined and separate standards used for standards

Why are We Investigating PFC Contamination in Southern NH?

- On 26 Feb., Saint-Gobain Performance Plastics reported to DES results of water tests at its Merrimack facility
- PFOA was detected at 30 parts per trillion in water supplied by Merrimack Village District Water System (MVD)
- NHDES and MVD took immediate steps to sample drinking water in the area, which will be described in detail later

Why did Saint-Gobain Perform Testing?

- Saint-Gobain has a history of PFOA use at their Merrimack facility
- Saint-Gobain has facilities in Hoosick Falls, NY and North Bennington, VT that also used PFOA
- PFOA contamination of groundwater and drinking water at levels above the PHA have been detected in the vicinity of both the NY and the VT facilities

Saint-Gobain APFO Use and Air Permit History in Merrimack

- PFOA (as APFO) was used at the Saint-Gobain facility dating back to at least 2001
- APFO is regulated by NHDES as an air toxic pollutant
- In 2001, Saint-Gobain obtained a permit for expanded operations. Emissions testing from similar NY facilities showed no detection of APFO
- 2004 – Following testing with improved methods, Saint-Gobain shared data with NHDES identifying that APFO emissions were occurring

Saint-Gobain APFO Use and Air Permit History in Merrimack

- 2005 – Following emissions testing in Merrimack, NHDES determined that the potential existed to exceed ambient air limits for APFO
- 2006 – Administrative Order by Consent requiring the phase-out of APFO use at facility
- 2007 – Substantial reductions achieved
- Current emissions of APFO reported by Saint-Gobain to be at or near zero

Saint-Gobain APFO Use Investigation at Merrimack Facility

- NHDES has made a comprehensive Information Request to Saint-Gobain relative to its past use of APFO, including:
  - A comprehensive review of past use and handling of APFO and other PFCs in Merrimack, including dates and quantities
  - Information regarding routine disposal practices
  - Information regarding any past spills, releases, or emissions of APFO
- NHDES has also requested that Saint-Gobain conduct an initial soil and groundwater investigation

PFCs as an Emerging Contaminant and EPA's Provisional Health Advisory

- PFOA/PFOS are not currently regulated under the Safe Drinking Water Act
- 2009 - EPA established a Provisional Health Advisory (PHA):
  - 400 parts per trillion (ppt) PFOA
  - 200 ppt PFOS
- The PHA was a health-based concentration, above which action should be taken to reduce exposure to PFOA through drinking water
- The PHA was based upon short-term exposure

New Lifetime Health Advisories for PFOA and PFOS

- May 19, 2016 USEPA issued lifetime health advisories for PFOA and PFOS
- PFOA: 70 parts per trillion (ppt)
- PFOS: 70 ppt
- Combined PFOA and PFOS: 70 ppt
- Advisories set by USEPA based upon most sensitive human receptors
- NHDES reviewed and concluded to be appropriate and protective of public health

Establishment of Ambient Groundwater Quality Standards for PFOA and PFOS

- May 31, 2016 (Today) NHDES filed an emergency rule to adopt ambient groundwater quality standards (AGQS) for PFOA and PFOS
- PFOA: 0.07 µg/l or 70 parts per trillion (ppt)
- PFOS: 0.07 µg/l or 70 ppt
- Combined PFOA and PFOS: 0.07 µg/l or 70 ppt
- AGQS is enforceable for purposes of site remediation requirements, provision of alternate drinking water, and for public water systems

Health Effects

Prepared by:
Dr. Benjamin Chan
State Epidemiologist

“How are we exposed to PFCs?”

Commercial and Industrial Products That Use PFCs

Commercial Products	Industrial Uses
Cookware (Teflon®, Nonstick)	Photo Imaging
Fast Food Containers	Metal Plating
Candy Wrappers	Semiconductor Coatings
Microwave Popcorn Bags	Aviation Hydraulic Fluids
Personal Care Products (Shampoo, Dental Floss)	Medical Devices
Cosmetics (Nail Polish, Eye Makeup)	Firefighting Aqueous Film-Forming Foam
Paints and Varnishes	Insect Baits
Stain Resistant Carpet	Printer and Copy Machine Parts
Stain Resistant Chemicals (Scotchgard®)	Chemically Driven Oil Production
Water Resistant Apparel (Gore-Tex®)	Textiles, Upholstery, Apparel and Carpets
Cleaning Products	Paper and Packaging
Electronics	Rubber and Plastics
Ski Wax	

List Produced by CDC/ATSDR

PFOA Exposure Decreasing

- Most people have been exposed to PFOA through everyday commercial products
- In 2006, PFOA manufacturers joined an EPA global stewardship program:
  - On track to phase out these chemicals by the end of 2015

EPA. 2010/2015 PFOA Stewardship Program. Accessed at: http://www.epa.gov/opptintr/pfoa/pubs/stewardship/

PFOA Exposure is Through Oral Ingestion

- Consumption of food and water is the most important source for exposure to PFCs (includes migration of PFCs into food from boxes/packaging)
- Ingestion of contaminated dust is a significant source of exposure (carpets, upholstery, clothing)
- In infants, toddlers, and children, hand-to-mouth behavior is a significant source of exposure
- Limited exposure through breathing
- Minimal exposure through skin contact

Trudel et al. Estimating Consumer Exposure to PFOS and PFOA. Risk Analysis. 2008;28(2):251-69.

“What does finding PFOA in our water mean for our health?”

Long Term Health Effects are Unclear

- Animal studies: varied health effects
- Studies of PFC exposure in animals do not necessarily predict the same health impacts in humans
- Human studies have evaluated a variety of health effects without consistent findings

Health Effects Being Studied

- Changes to the liver enzymes levels
- Increases in total cholesterol levels
- Increases in uric acid levels, which may affect blood pressure
- Changes in sex hormone levels that could affect reproductive development and puberty
- Changes in thyroid hormone levels
- Lower immune function (lower antibody response to immunization)
- Growth and development (lower birth weight in infants, obesity in adolescents/adults, cognitive and behavioral development)
- Decreased kidney function
- Incidence of insulin resistance and diabetes
- Occurrence of some types of cancers: prostate, kidney, and testicular cancer

C8 (PFOA) Health Project, 2005-2006

- Environmentally exposed study of 69,030 participants from West Virginia and Ohio (Ohio-River Valley)
- Exposed to PFOA from a Chemical Plant
- One of the largest and most important studies of health effects in an environmentally exposed community

http://www.c8sciencepanel.org/prob_link.html

Link Report

- Health “links” were determined by three independent epidemiologists that reviewed the science
- “Probable link" – “more likely than not that among class members a connection exists between PFOA exposure and a particular human disease.”
- Based on a class action lawsuit settlement
- Reports do not represent the consensus of the medical/scientific community about the health effects from PFOA

http://www.c8sciencepanel.org/prob_link.html

C8 Science Panel Link Reports:

No "Probable Link":

- HTN
- Coronary Heart Disease
- Stroke
- Chronic kidney disease
- Liver disease
- Osteoarthritis
- Parkinson's disease
- Other autoimmune diseases (other than UC)
- "Common infections" (i.e. influenza)
- Neurodevelopmental disorders, including ADHD and learning disabilities
- Asthma or COPD
- DM type 2
- Birth defects
- Miscarriage or stillbirths
- Preterm birth or low birth weight

"Probable Link":

- High cholesterol
- Thyroid disease
- Ulcerative colitis
- Testicular cancer
- Kidney cancer
- Pregnancy-induced hypertension

http://www.c8sciencepanel.org/prob_link.html

NH DIVISION OF Public Health Services
Improving health, preventing disease, reducing costs *for all*
New Hampshire Department of Health & Human Services

Difficulty Interpreting the Science

- Studies are not consistent: some studies found associations, but others looking at the same health effect did not
- Even though some studies have found associations between PFCs and health outcomes, it does not mean that PFCs *caused* these effects
- The effects may have been due to other factors that were not considered by the researchers
- Changes identified often are not clinically (biologically) relevant

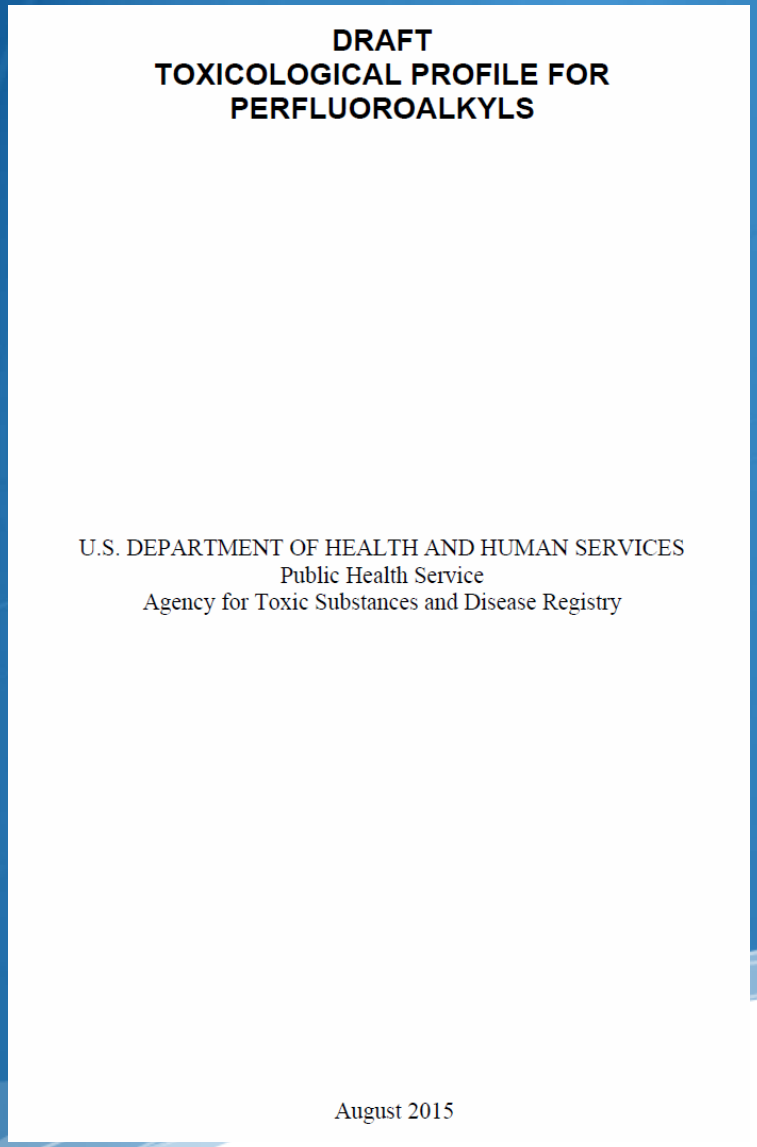
Studies Have More Consistently Suggested an Association With:

- Increases in blood cholesterol
- Increases in blood uric acid levels
- Increases in some liver function tests
- Lower infant birth weights

What do these ultimately mean for a person's health?

ATSDR Perfluoroalkyl Toxicological Profile, August 2015. Available at: gov/substances/toxsubstance.asp?toxid=237

Comprehensive Review of the Science Evaluating Cancer and PFCs



DRAFT
TOXICOLOGICAL PROFILE FOR
PERFLUOROALKYLS

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry

August 2015

NH DIVISION OF
Public Health Services
Improving health, preventing disease, reducing costs *for all*
New Hampshire Department of Health & Human Services

ATSDR's Conclusions on PFCs and Cancer

"There is no conclusive evidence that perfluoroalkyls cause cancer in humans. Some increases in prostate, kidney, and testicular cancers have been seen in individuals exposed to high levels. These results should be interpreted cautiously because the effects were not consistently found and most studies did not control for other potential factors such as smoking."

ATSDR TOX FAQs. Available at: http://www.atsdr.cdc.gov/tfacts200.pdf

Summary

- There is a lot of uncertainty about what PFC exposure means for a person's health
- The health changes with more consistent findings related to PFC exposure (i.e. liver function tests) have unclear health implications
- Associations found between PFOA and several cancers are unclear and inconsistent, and need to be interpreted cautiously
- Further study is ongoing

Should we get our blood tested for PFOA?

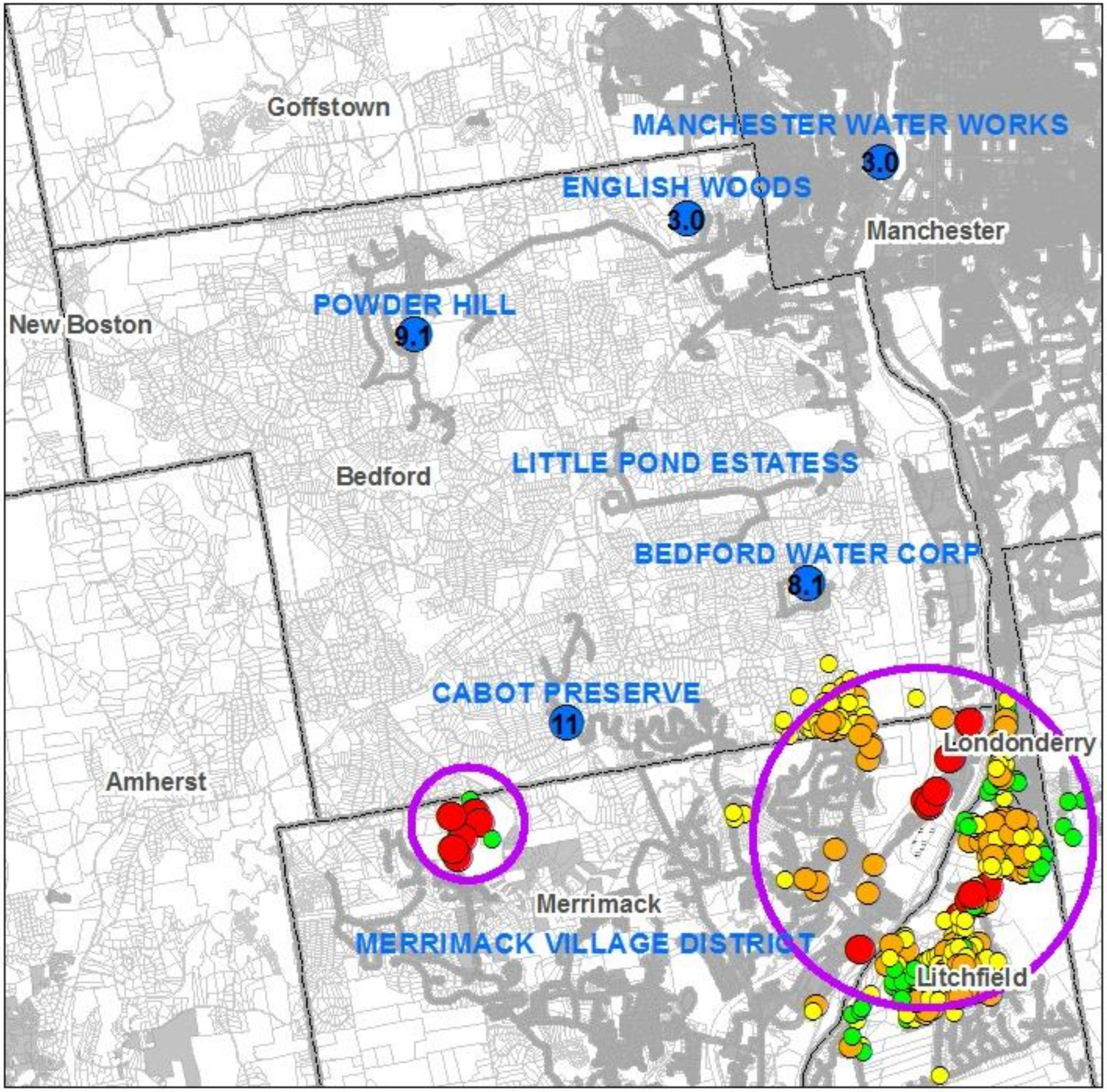
- PFOA blood testing is not commonly available
- There is no medical need or recommendation to get your blood tested for PFOA
- A PFOA blood test will have limited use by your healthcare provider to guide healthcare decisions
- A blood test **can** tell you how much PFOA is in your body at the time of the test
- A PFOA blood test **cannot**:
  - Tell you where or how you were exposed to the PFOA found in your body
  - Tell you what, if any, health problems might occur, or have occurred, because of the PFOA in your body

- We recognize that some people will want more information about their level of PFOA exposure
- DHHS is working to find a means to make PFC blood testing more readily available to individuals through their primary care providers
- DHHS will be sending information to individuals whose drinking water tested at > 70 ppt PFOA/PFOS with information about PFC blood testing options in the coming weeks
- DHHS will also be increasing communication with healthcare providers to help inform providers about PFCs and understand our healthcare recommendations

Public Water Supply Sampling and Water Treatment

Brandon Kernen

Manager of Hydrology and Conservation, Drinking Water and Groundwater Bureau



BEDFORD WATER SUPPLIES

Investigation Areas

PFOA + PFOS (PPT)

- ≥ 400
- 70 - <400
- 10 - <70
- <10
- Result Pending

Public Water Supplies

Water Distribution

Political Boundary

1 in = 7,000 feet

1:84,000

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

PFOA/PFOS Sampling Results for Merrimack Village District Water Works

[1]data for April 14 is preliminary

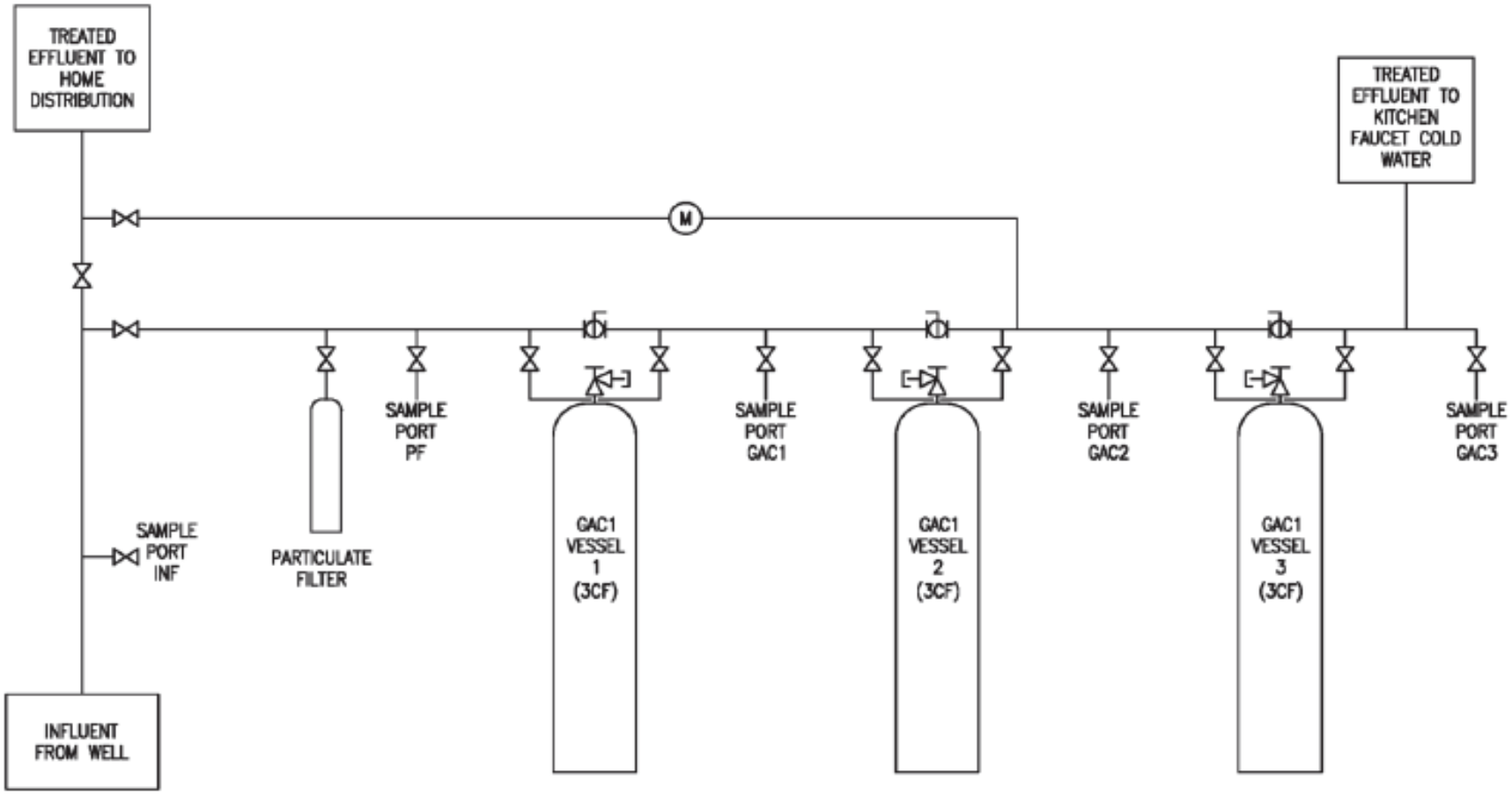
**MVD 7&8 TP –is a blend of MVD wells 7 and 8 after green sand treatment*

Well Name:	MVD-2	MVD-3	MVD-4 (offline)	MVD-5 (offline)	MVD-7	MVD-8	MVD-7&8 TP*
5/12/16	Results Pending	Results Pending	Results Pending	Results Pending	Results Pending	Results Pending	Results Pending
5/5/16	Results Pending	Results Pending	Results Pending	Results Pending	Results Pending	Results Pending	Results Pending
4/28/16	24/ND	25/ND	85/5.9	57/ND	21/ND	9.2/ND	14/ND
4/21/16	26/5.5	26/ND	93/7.0	56/5.4	25/5.4	9.9/9.1	16/ND
4/14/16	31/15	32/6.1	94/8.8	67/5.5	30/7.0	10/ND	18/4.9
4/7/16	28/ND	Not Available – Scheduled Maintenance	94/6.8	52/ND	28/5.5	8.6/ND	Not Sampled
3/31/16	27/ND	Not Available – Scheduled Maintenance	90/5.6	56/ND	26/ND	8.5 & 9.7/ ND & ND	Not Sampled
3/9/16	17/ND	Not Available – Scheduled Maintenance	90/6	54 & 52/ND &ND	Not Available – Scheduled Maintenance	Not Available – Scheduled Maintenance	Not Sampled

Water Treatment

- NHDES developed a PFC Treatment Factsheet
- Need to pay attention to “traditional contaminants”
  - They are not good for you either
- A lot of information being shared from Hoosick Falls, homeowners & water treatment companies
- Point of Use
  - Reverse Osmosis (removes PFCs & Other Contaminants)
  - Granular Activated Carbon
    - Certain units have been tested and shown to remove PFCs to non-detect levels
    - Certain faucet, water pitcher, refrigerator based filters likely reduce but do not remove PFCs to non-detect levels.
- Point-of-entry treatment
    - Granular Activated Carbon(not an “off-the-shelf” product)
      - Radon build-up in granular activated carbon needs to be addressed
      - Does not remove other common contaminants in well water

Typical Design of a Point of Entry for a Home

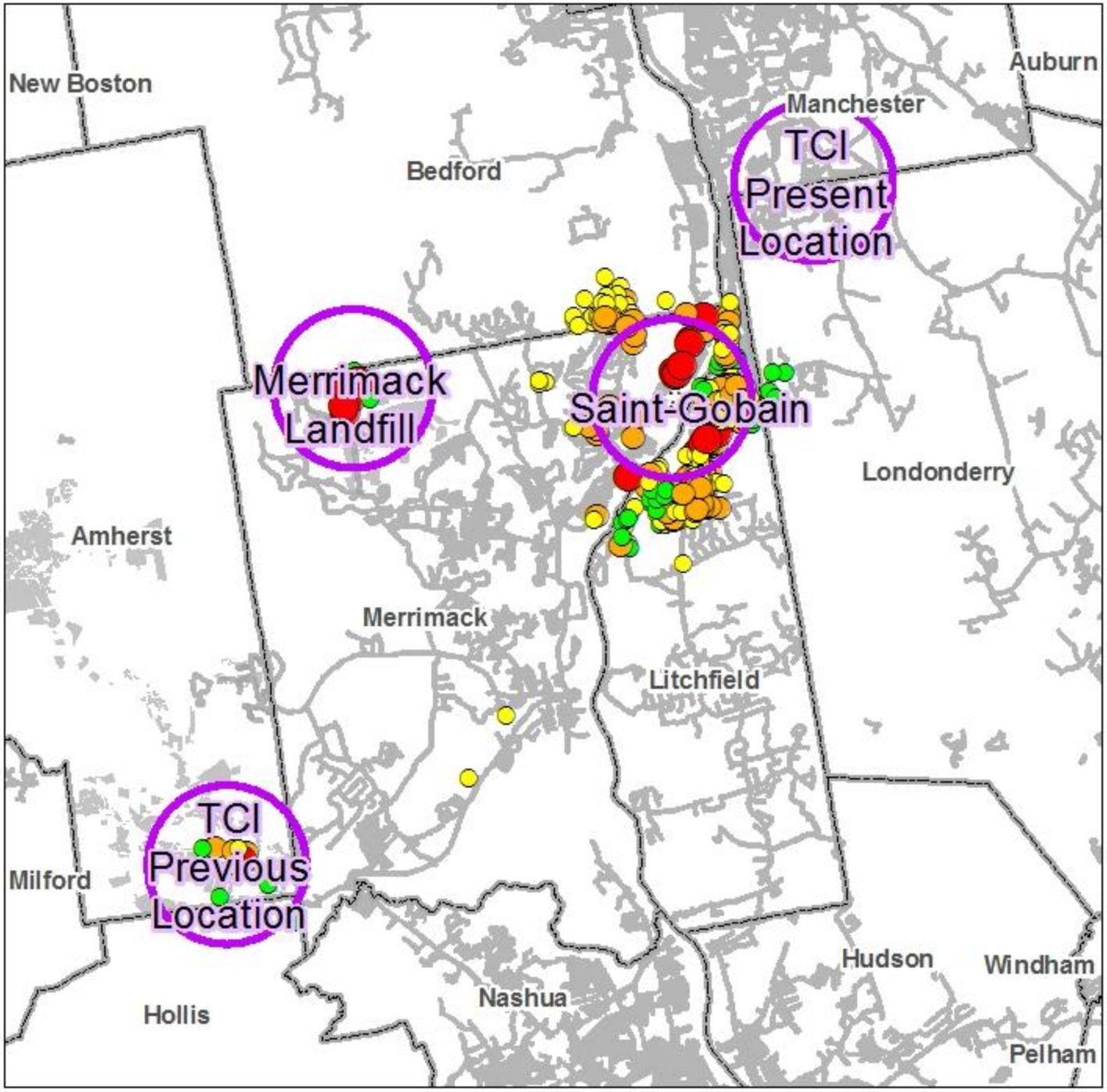


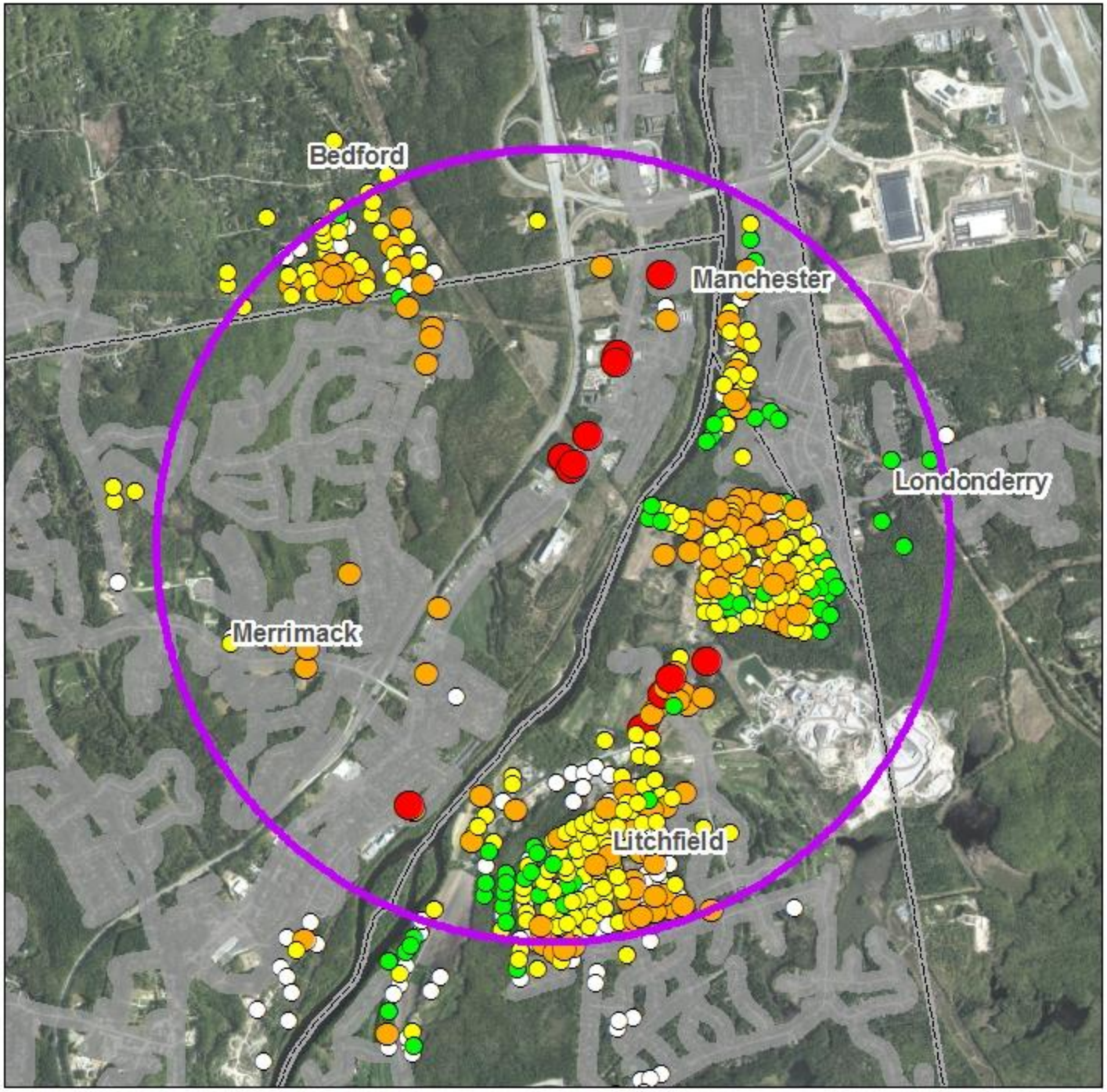
Available information suggests treatment systems with two (2 cubic foot) granular activated carbon vessels may be adequate. Pease system has three (3 cubic foot) vessels

Status of Investigations

John Regan

Administrator, Hazardous Waste Remediation


New Boston
Auburn
Manchester
TCI
Present
Location
Bedford
Merrimack
Landfill
Saint-Gobain
Londonderry
Amherst
Merrimack
Litchfield
TCI
Previous
Location
Milford
Hudson
Windham
Nashua
Hollis
Pelham
SITES
1.0 Mile
PFOA + PFOS (PPT)
≥ 400
70 - <400
10 - <70
<10
Result Pending
Public Water Supplies
Water Distribution
Political Boundary
1 in = 10,000 feet
1:120,000
NEW HAMPSHIRE
DEPARTMENT OF
Environmental
Services



SAINT-GOBAIN

1.5 Mile

PFOA + PFOS (PPT)

- ≥ 400
- 70 - <400
- 10 - <70
- <10
- Result Pending

Public Water Supplies

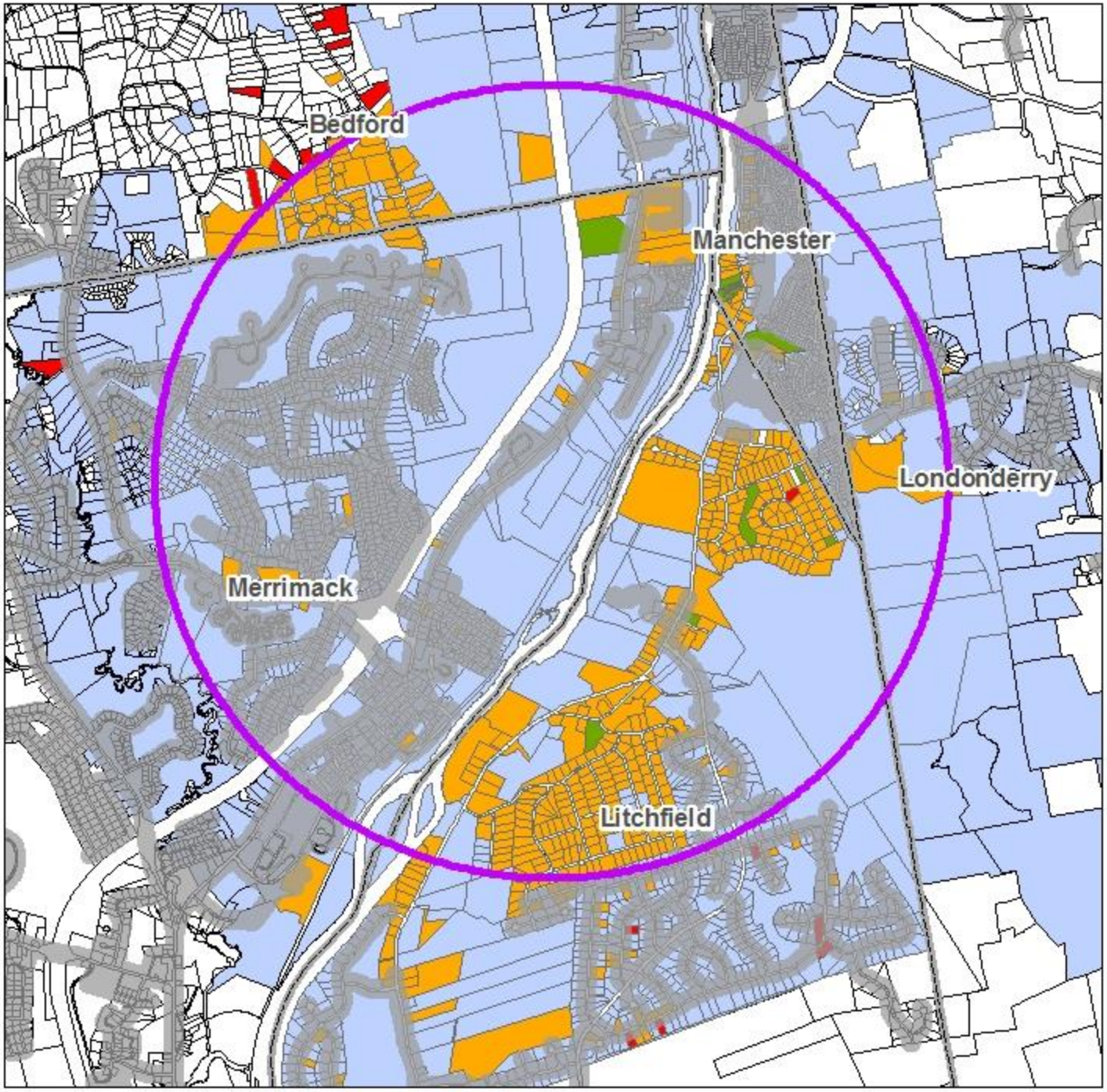
Water Distribution

Political Boundary

1 in = 3,000 feet

1:36,000

NEW HAMPSHIRE DEPARTMENT OF Environmental Services



SAINT-GOBAIN

1.5 Mile

Sampling Status

- Sampled
- Scheduled
- Contacted
- No Well On Site

Public Water Supplies

- Water Distribution
- Political Boundary

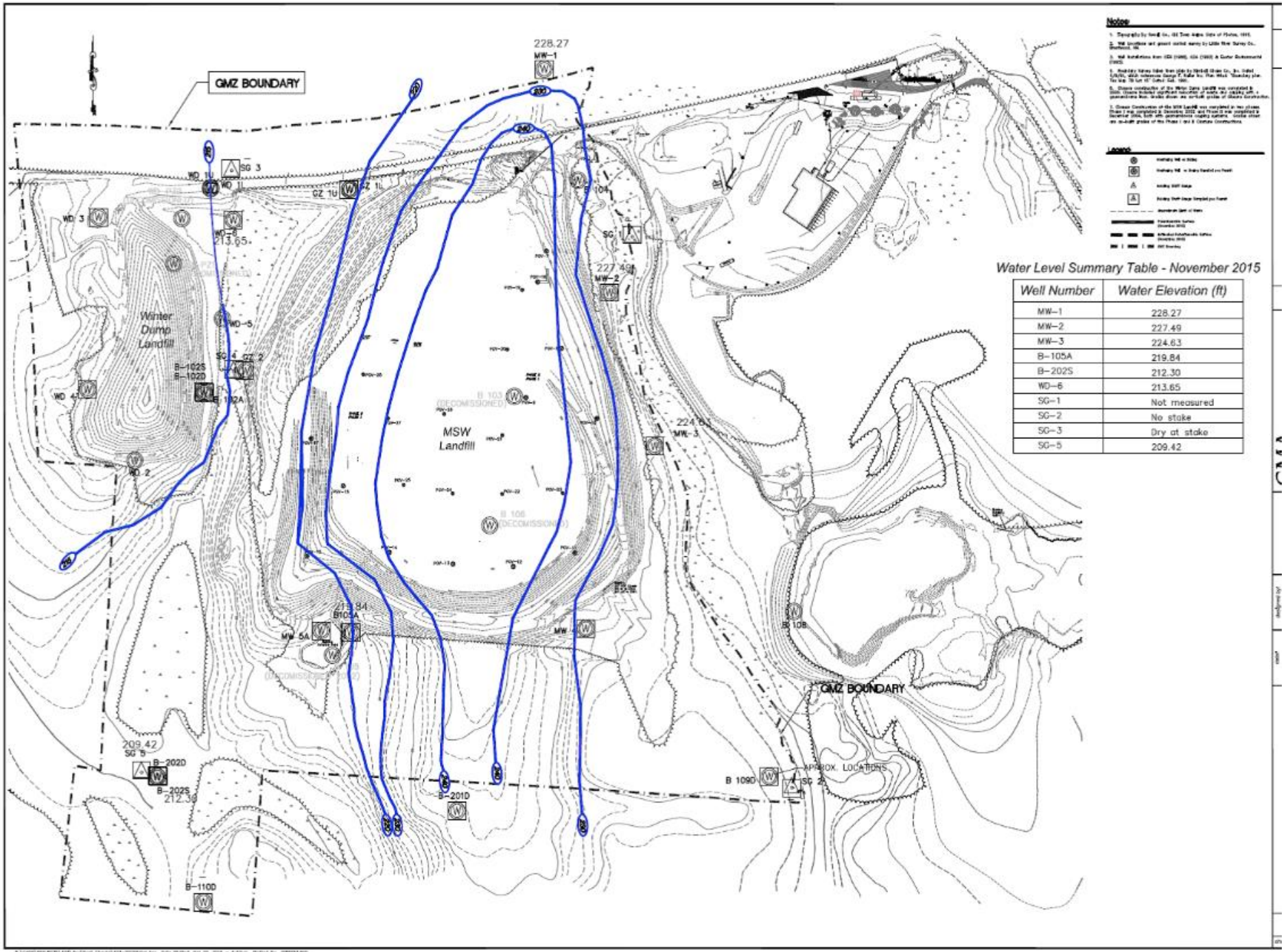
1 in = 3,000 feet

1:36,000

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

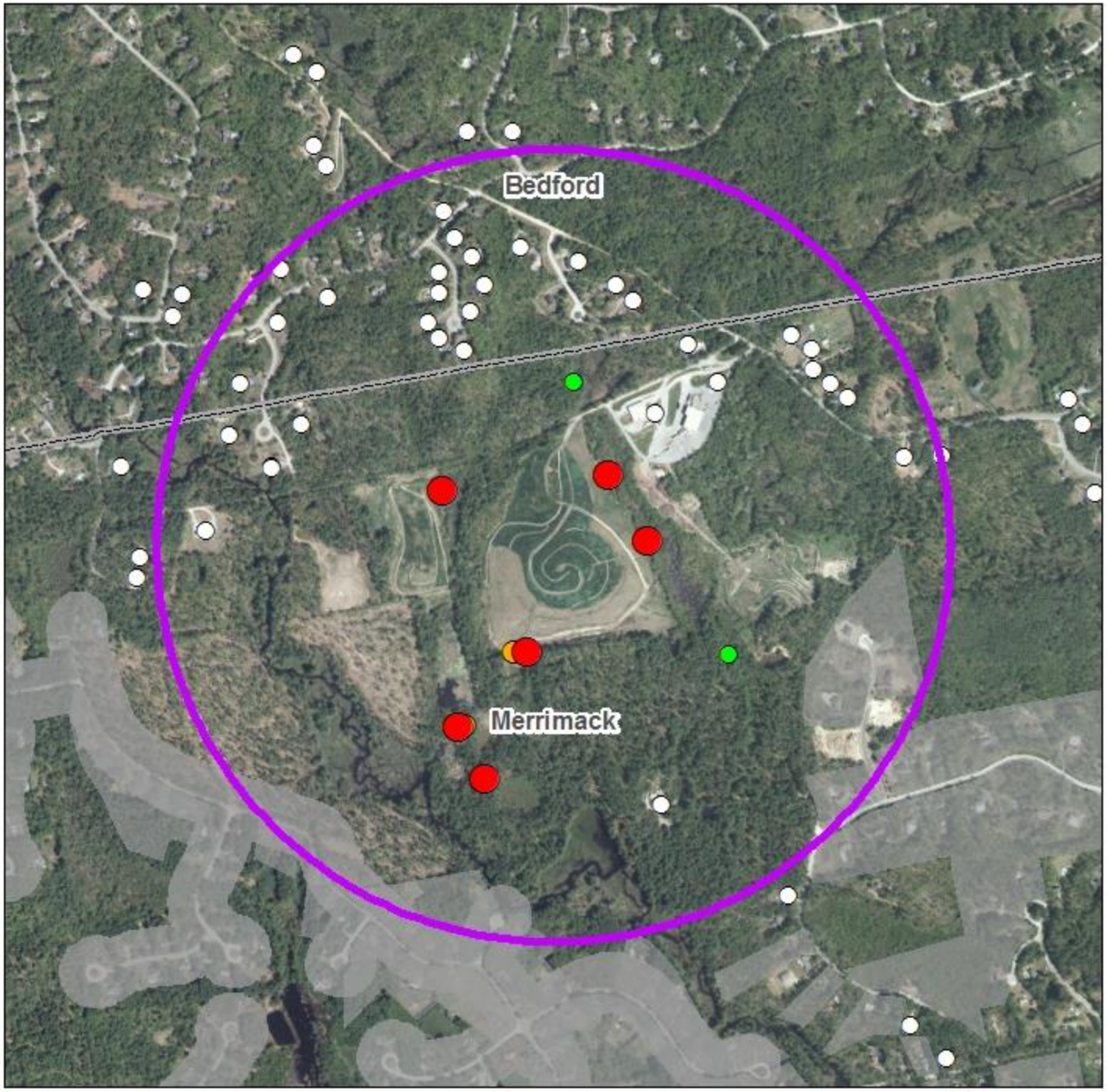
Merrimack Landfill

- Unlined landfill operated from early 1970's to 2003
  - +/- 25 acres in 138 parcel
  - Capped with impermeable geomembrane in two phases (December 2002 and November 2004)
- 4/13/16: NHDES requested technical assistance from USEPA – sampling 10 monitoring wells
- 4/28-29/16: USEPA sampled monitoring wells
- 5/12/16 Draft results provided
  - 8 of 10 wells above 70 ppt (health advisory=AGQS)
- 5/17/16 Residential well sampling started



Water Level Summary Table - November 2015

Well Number	Water Elevation (ft)
MW-1	228.27
MW-2	227.49
MW-3	224.63
B-105A	219.84
B-202S	212.30
WD-6	213.65
SG-1	Not measured
SG-2	No stake
SG-3	Dry at stake
SG-5	209.42



MERRIMACK LANDFILL

0.5 Mile

PFOA + PFOS (PPT)

- ≥ 400
- 70 - <400
- 10 - <70
- <10
- Result Pending

Public Water Supplies

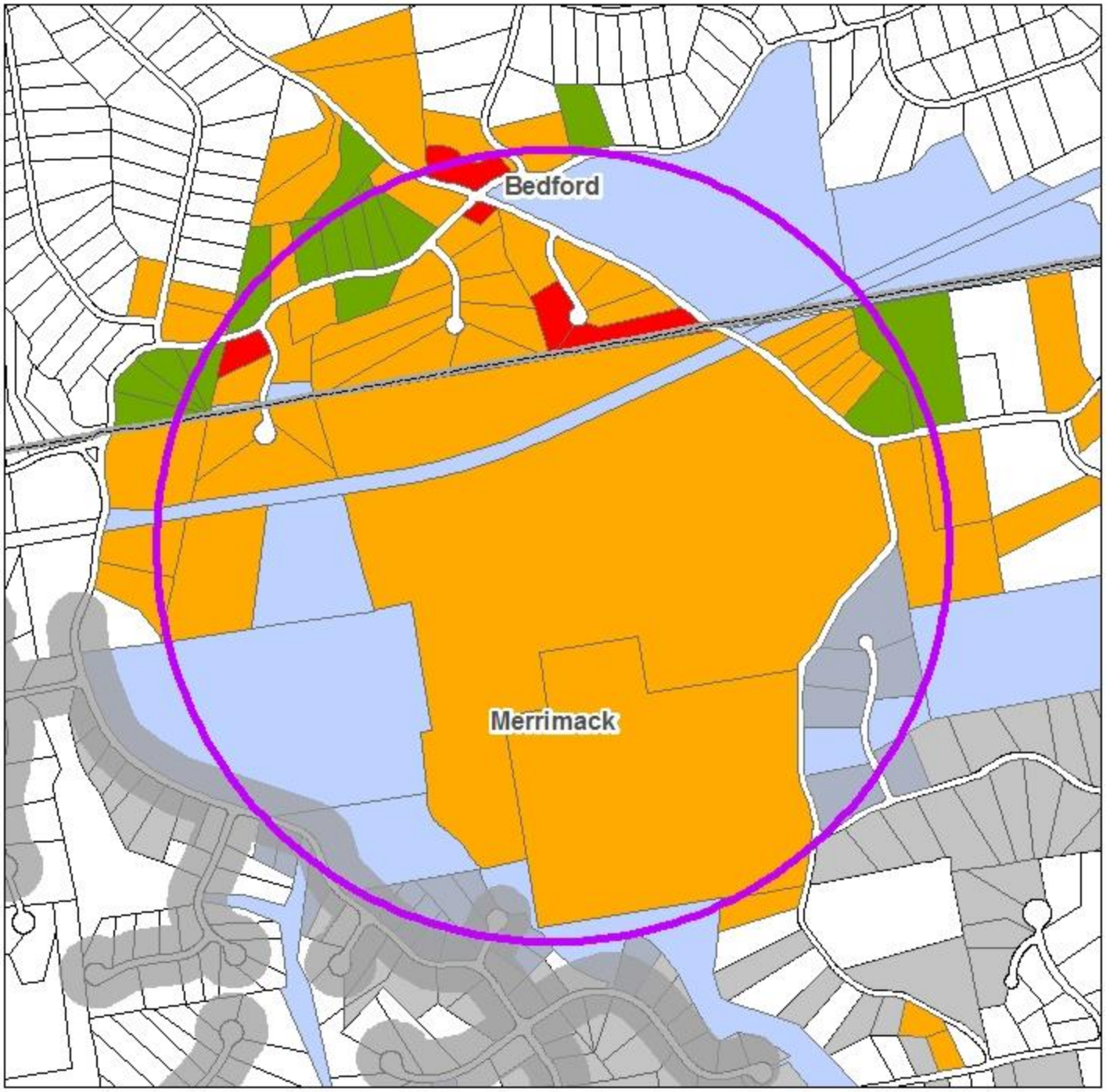
Water Distribution

Political Boundary

1 in = 1,000 feet

1:12,000

NEW HAMPSHIRE DEPARTMENT OF Environmental Services



MERRIMACK LANDFILL

0.5 Mile

Sampling Status

- Sampled
- Scheduled
- Contacted
- No Well On Site

Public Water Supplies

- Water Distribution

- Political Boundary

1 in = 1,000 feet

1:12,000

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

SAINT-GOBAIN				
TOWN	CONTACTED	SAMPLED	SCHEDULED	SHARED WELL
Bedford		54	10	
Hollis		3		
Litchfield	6	386	7	1
Londonderry		5		
Manchester	3	26		
Merrimack	1	33	1	1
TOTAL	10	507	18	2

TCI AMHERST				
TOWN	CONTACTED	SAMPLED	SCHEDULED	SHARED WELL
Amherst	34	115	15	9
Hollis		18	2	
Merrimack		8		
TOTAL	34	141	17	9

MERRIMACK LANDFILL				
TOWN	CONTACTED	SAMPLED	SCHEDULED	SHARED WELL
Bedford	13	27	5	
Merrimack	2	25		
TOTAL	15	52	5	0

GRAND TOTAL	**59**	**700**	**40**	**11**

Next Steps and Information/Communication

Clark Freise
Assistant Commissioner

Next Steps

- Any properties that test over 70 ppt of combined PFOA/PFOS will have bottled water delivered
  - Alternatives are being examined (filter, public water, etc.)
- We are continuing to test wells to complete the investigation areas
  - We will follow the data
  - Sign-up form at https://www.surveymonkey.com/r/NHDES-S-03-008

Next Steps (cont.)

- Saint-Gobain
  - Continuing to follow the data
  - Letters requesting access have been mailed
  - Waiting for soil sample results
- Amherst
  - Continued well testing
  - Demand letter to TCI is being sent
    - Soil sampling, etc.
- Merrimack Landfill
  - Request for past records
  - Continued testing around site
- ½ mile versus 1 mile
- Other sites throughout the state are being tested

Information/Communication

- Southern NH PFOA Investigation Website:
  - http://des.nh.gov/organization/commissioner/pfoa.htm
- Handouts (all available on the Investigation website)
  - EPA PFOA Fact Sheet
  - Well Testing Information
  - Water Treatment Options Fact Sheet
  - Blood Testing Fact Sheet
- We will share information through further face-to-face meetings as results arrive
  - We will continue to communicate with your town

Questions and Answers (written)

Rick Sawyer

Questions and Answers (verbal)

Rick Sawyer